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Our Ref: LA/1814/01bR/ML

**Phase 3A, Land to the north of Ann Suckling Road
Little Wratting, Haverhill, Suffolk**

Environmental Noise Assessment

Client: Persimmon Homes Suffolk
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1. CONSULTANCY BRIEF

- 1.1. Utilising traffic flow data from previously submitted Transport Assessments (TA) for the site, and generic external mechanical plant data, calculate the predicted noise level generated by passing traffic on local roads, and commercial delivery and plant noise at the proposed Local Centre, and assess the noise impact on the residential elements of the Phase 3A development.
- 1.2. Based on the latest detailed layout, provide a suitable mitigation scheme to protect future residents' amenity in accordance with the previously accepted criteria of the local authority.
- 1.3. Provide a technical report suitable for submission to the planning authority in support of the Reserved Matters application for Phase 3A, detailing the findings and recommendations to enable the planning criteria to be met.

2. REPORT SUMMARY

- 2.1. Persimmon Homes Suffolk is developing a parcel of land north-east of Haverhill, known as the Boyton Place development. Loven Acoustics has been commissioned to provide a noise assessment for Phase 3A of the development, with the construction of 83no. new dwellings and three retail and commercial units in a Local Centre, including a 'local' size supermarket.
- 2.2. TA based noise data have been assessed against the planning criteria of BS 8233:2014. A scheme for glazing and ventilation has been provided to demonstrate compliance with the criteria for internal noise levels.
- 2.3. All gardens on the site, and adjacent POS, are predicted to be within the BS 8233 guidelines for outside amenity space noise level, based on inherent shielding from on-site buildings and distance attenuation from the road noise.
- 2.4. Consideration has also been given to the potential noise impact from the proposed Local Centre. Delivery vehicle and unloading noise may generally be controlled by restricting hours, in this instance to 07:00-22:00 Mon-Sat, and 09:00-13:00 on Sundays and bank holidays.
- 2.5. Based on estimated plant noise and baseline noise data, the noise impact on the closest future dwellings was predicted, in accordance with the typical local authority criteria of BS 4142:2014+A1:2019. The findings were that the cumulative noise level is likely to be below the estimated background noise levels. However, to ensure a robust margin of comfort, it has been recommended that the plant area be enclosed as much as is practical, and that care is taken to select quiet external condenser units.
- 2.6. In conclusion, if the recommendations within this report are incorporated into the development design, the criteria for noise of the planning authority is predicted to be met for this phase of the development. This document is therefore considered suitable to support the detailed planning application for the proposed Phase 3A development.

3. INTRODUCTION

- 3.1. Persimmon Homes Suffolk proposes to develop a parcel of land known as Phase 3A, north-east of Haverhill centre, by construction of 38no. new detached, semi-detached and terraced houses, 27no. apartments in four 3-storey blocks, and a further 18 apartments on the 1st and 2nd floors above retail units of a small Local Centre, situated in the south-west corner of the phase site. This centre will consist of a local-size supermarket and two smaller units, the usage of which is yet to be decided. This phase is part of the Boyton Place development, which is currently under construction on other phases, off the A143 Haverhill Road.
- 3.2. The site is former agricultural land north of Ann Suckling Road, and has, or will have, residential areas to the south, east and west aspects. To the immediate north-west of the site, a public open space (POS) with a small sports pitch and exercise/play equipment is proposed. South-west of the site will be a new primary school and sports pitch, although these are sufficiently remote from Phase 3A dwellings so as not to be considered a significant noise source.
- 3.3. The site may be affected by road traffic noise on the access road running along the northern boundary of the site, and the new Relief Road 100m north of the site. Traffic flow data from the TA for the Relief Road indicates continuous traffic throughout the day and into late evening, significantly subsiding but still reasonably consistent throughout the night. Traffic flow on 'Road B', as the TA called the road along the northern boundary of Phase 3A, will be significantly less but is much closer than the relief road.
- 3.4. All other roads around the site will be relatively quiet local access roads, and the A143 is situated over 500m to the east of the site at its closest approach, so traffic on that road will have very little noise impact on the Phase 3A development.
- 3.5. Based on the site location, noise from passing traffic on Road B and the Relief Road is consequently considered to be the only traffic noise sources with the potential to have an adverse impact on future residents of the development. However, noise from commercial activity and mechanical plant associated with the small proposed Local Centre within Phase 3A will also be considered.
- 3.6. Loven Acoustics has been commissioned to provide an assessment of environmental noise affecting Phase 3A, based on the latest layout, and provide a report suitable to support a new Reserved Matters planning application.

4. NOISE LIMITING CRITERIA

- 4.1. Persimmon Homes are seeking planning permission for a Reserved Matters application for Phase 3A. The West Suffolk Council Public Health & Housing team, as technical consultees to the planning committee, requires a noise assessment to be submitted to support the application.
- 4.2. The criteria for assessment have been established by the submission of a noise assessment for the first phase of the development in 2017. Conditions 17 and 18 of Application no. DC/16/2836/RM for Phase 1 refer to the criteria of BS 8233:2014 guidelines for target noise levels for both internal habitable rooms and external amenity areas/gardens. The following table summarises the specific maximum noise levels recommended in the condition criteria, which are expected to also apply to this phase.

Table 1. Guidance for internal & external noise levels.

Guidance	Living rooms (0700-2300)	Bedrooms (2300-0700)	Outside Amenity Areas (0700-2300)
BS 8233:2014 <i>Sound insulation and noise reduction for buildings</i>	35dB LAeq	30dB LAeq	≤50dB LAeq

- 4.1. Glazing and other mitigation measures will be considered which will achieve the design standard noise levels as listed for the BS 8233 recommendations, thus conforming with the local authority requirements.
- 4.2. It is also noted that an Environmental Statement submitted in support of the outline planning application for the whole site (Ref: SE/09/1283/OUT) included a section relating to the noise impact of external plant and delivery vehicle movements at the new Local Centre. The ES concluded that the likely impact of noise from the plant would be neutral to minor adverse, and suggested a number of mitigating factors in relation to delivery vehicles.
- 4.3. The suggested mitigating factors for delivery vehicle noise include screening of the loading bay to dwellings, limiting delivery hours, and where possible, limiting vehicle reversing to reduce reverse alarm noise. These factors were considered in the final design process and will be addressed in this report.

5. PREDICTED TRAFFIC NOISE

- 5.1. Traffic on the new relief road is considered the primary traffic noise source with the potential to impact on the Phase 3A site, although 'Road B', adjacent to the northern boundary is likely to carry school traffic. Other local access roads close to the site are predicted to have a low traffic flow, which should not pose any significant impact on residents.
- 5.2. Whilst no specific assessment of traffic on the new relief road has been carried out for the current planning application, there are documents and guidelines available to provide the information required for this assessment. A Transport Assessment (TA) by MLM was provided with the outline application for the overall site in 2009, which predicted peak time traffic flow on the roads from all traffic including the completed new development. This document is considered to be sufficiently accurate to provide the basis for calculating the likely overall traffic flow and noise, post-development, including non-development traffic.
- 5.3. Table 2 below summarises the findings of the TA in terms of development traffic predictions at peak times on the section of the relief road and Road B past the Phase 3A site. The TA predicted the traffic flow up to 2019, with a growth factor of 1.164 from 2007. It is considered reasonable to utilise a similar growth factor for the 12-15 years from 2022 up to 2035.

Table 2. Predicted 'existing' + full development traffic at 2019, from 2009 TA, up to 2035

Period (1 hour)	Traffic flow (both ways) 2019	Extrapolated flow to 2035
Relief Road		
Peak a.m.	622	724
Peak p.m.	742	864
Road B		
Peak a.m.	217	252
Peak p.m.	280	326

- 5.4. The TA suggests that to establish the AADT the peak hour flow should utilise a factor of 13.37 on the a.m. flow or 12.34 on the p.m. flow. By utilising the values above for the 2035 flow, it is seen that the p.m. flow with a AADT factor of 12.34 gives the higher flow of the two periods at 10662 and 4021 AADT for the Relief Road and Road B respectively. These values will be utilised to provide the most robust assessment.

- 5.5. The *National Travel Survey: 2012* (NTS), commissioned by the Department of Transport, and revised in September 2013, provides data on the spread of traffic volumes during weekdays and weekends. The chart on page 11 of the document, based on Table NTS0501 on their website shows the daily relative spread in graphical form. The findings are that peak hours generally account for approximately 10% of the overall daily traffic flow on non-motorway roads.
- 5.6. By utilising the data in the table, the Survey provides it is possible to extrapolate the predicted peak traffic level on the link road and Road B to determine 18-hour basic noise levels in accordance with the methodology of the document *Calculation of Road Traffic Noise* (CRTN) issued by the Department of Transport Welsh Office.

Assessment of noise impact

- 5.7. Table 3 below summarises the CRTN noise level calculations, taking into account the various parameters and corrections suggested by the guidelines and arrives at a 16hr L_{Aeq} value (daytime 07:00 to 23:00). The table also shows the predicted 8hr L_{Aeq} night-time values (23:00 to 07:00), based on the likely level of traffic indicated by the NTS findings.
- 5.8. It should be noted that at this stage the speed limit on the roads is not known, or whether there will be any further traffic calming measures. The relief road will be used by HGV and will also be a bus route, so it expected that the speed limit will be 40mph at the most. In reality due to the location of a roundabout proposed north of the site (as shown on Figure 1 in the appendix), the typical speed closest to the site may be lower than 40mph. The speed limit on Road B will likely be 30mph. These factors will be considered in relation to the overall noise, as detailed in CRTN.
- 5.9. For the purposes of the calculations, it has been assumed that on the relief road, the percentage of HGV traffic (including buses) could be 10% of overall traffic. For Road B the percentage of HGV will likely be much less, between 0 and 5%. The roads do not appear to have any significant gradient at the points of closest approach to the Phase 3A site.

Table 3. Calculation of traffic noise levels

Parameters	Values	
	Relief Road	Road B
Estimated overall traffic flow per day based on TA data (5.3)	10662 AADT	4021 AADT
18hr (06:00 to 00:00) flow extrapolated from NTS spread (97%)	10342 18hr	3900 18hr
Basic noise level (at 3.5m from kerb) from CRTN Chart 3	69dB $L_{A10,18hr}$	64dB $L_{A10,18hr}$
Correction for speed (40mph and 10% HGV) Chart 4 CRTN	+1dB	-3dB
Correction for road surface (unknown but assumed impervious as worst case) Section 16.1 CRTN	-1dB	-1dB
Resultant 18hr basic noise level	69dB $L_{A10,18hr}$	60dB $L_{A10,18hr}$
Conversion to 16hr L_{Aeq} (as described in former PPG24)	-2dB	-2dB
16hr average daytime L_{Aeq} (07:00-23:00) at 3.5m from kerb	67dB $L_{Aeq,16hr}$	58dB $L_{Aeq,16hr}$
Extrapolation to night-time noise (23:00-07:00) based on expected traffic flow* at 3.5m from kerb	55dB $L_{Aeq,8hr}$	47dB $L_{Aeq,8hr}$

* Night-time traffic volumes as per NTS flow spread

5.10. The following assessment will be based on the data in the table above. Suitable corrections for distance and any shielding will be included in calculations.

6. NOISE IMPACT & RECOMMENDATIONS

- 6.1. The noise data shown in Table 3 above indicate that traffic on the new Relief Road is predicted to generate a reasonably high noise level during the day, although there will be a significant reduction overnight. Table 3 also shows that traffic on Road B is expected to be much quieter, although it is closer than the relief road - passing the northern boundary of Phase 3A.
- 6.2. Based on the data a practical mitigation scheme may be provided for Phase 3A to ensure an adequate level of protection against noise. A detailed scheme is provided below. The scheme will include corrections for distance and shielding, and will be based on the cumulative impact of traffic on both the roads identified above.
- 6.3. It should be noted that this scheme is based on the latest Phase 3A layout drawings provided, Nos. 046-P-100 for the overall phase, and 046-P-001 for the flats over the Local Centre commercial units, both dated July 2024. The site layout is shown in Figure 2 in the appendix.

Internal Noise Levels

- 6.4. To ensure that internal noise levels will meet the BS 8233:2014 criteria detailed in Table 1, suitable glazing and ventilation should be installed. Note that the following scheme is based on the plot numbers shown on the aforementioned layout drawings provided.
- 6.5. Table 4 below summarises a suitable scheme of glazing and ventilation to meet the requirements for internal noise levels. The calculations utilise the logarithmic averages of the data measurement periods as required by BS 8233 methodology. The time periods shown relate to 07:00-23:00 (Daytime) and 23:00 to 07:00 (Night-time). The plot numbers indicated refer to the drawings detailed in section 6.3.

Table 4. Predicted internal noise levels and indicative glazing and ventilation recommendations for Phase 3A

Affected Plot Numbers (see Fig 2 in Appendix) Façades facing..	Daytime (dBL _{Aeq})	Night-time (dBL _{Aeq})	Indicative glazing performance (ventilation) **	
			Day rooms	Bedrooms
Plots 27,28,30,31,33,34 35-42, 51-57 North, West, East	30	18	R _w 29 (TV)	R _w 29 (TV)
Plots 74-77, 80-83 North, West, East	23	11*	R _w 29 (TV)	R _w 29 (TV)
Plots 13-26, 29,32, 43-45 North, West, East	22	9*	R _w 29 (TV)	R _w 29 (TV)
Plots 1-12, 46-50, 58-65, 66-73, 78,79 North, West, East	17	5*	R _w 29 (TV)	R _w 29 (TV)
All other plots and façades	<25	<15	R _w 29 (TV)	R _w 29 (TV)

* Internally generated noise may dominate

**** NOTE:**

- 6.6. (TV) Indicates background ventilation, as required by Part F of the Building Regulations can be provided by good quality frame mounted trickle vents. The calculations have assumed that trickle vents will be fully open with a subsequent loss of attenuation from the window of up to 5dB.
- 6.7. It may be noted that, as previously mentioned, traffic noise from the A143 is considered to be insignificant in comparison with assessed roads, due to the distance, and will not have a significant impact on the overall noise environment or influence the recommended mitigation shown above.
- 6.8. The glazing specification shown in Table 4 above is overall sound insulation level (SRI). Table 5 below shows indicative configurations of glazing which will meet the requirements. However, any other glazing configuration that can be demonstrated to at least match the performance specification should be acceptable.

Table 5. Indicative glazing configurations

Glazing specification (from Table 4)	Indicative Glazing Configuration (mm) glass/air/glass	Indicative Glazing Supplier
R _w 29dB	4/12-20/4	Pilkington

Note: It will be the responsibility of the window provider to ensure that the sound insulation values above are not compromised by the frames and sash seals. The above glazing applies to habitable rooms. Any non-habitable rooms such as hallways, bathrooms and separate kitchens will require only thermal glazing.

Outside Amenity Space

- 6.9. The detailed site layout of Phase 3A shows that most houses will have private gardens. There is also a large area of POS on the adjacent amenity space to the north of the site, for apartment residents. The design of the site is such that all of the gardens closest to, and potentially affected by, Road B will be protected from traffic noise to a large extent by shielding from their respective building shells, or from other buildings.
- 6.10. BS 8233 (and the more recent document ProPG) suggests that ideally the noise level in gardens and amenity space will not be above the range of 50-55dB $L_{Aeq,16hour}$. However, it does also acknowledge that where this is not possible to achieve, quieter areas of garden available for residents to enjoy may be an acceptable mitigation.
- 6.11. Calculations indicate that the daytime noise levels at the façades of the dwellings range from 43 to 48dB L_{Aeq} . It is therefore predicted that all garden space will be within the 8233/ProPG range. For the POS north of the site, the predicted daytime sound level is in the range of 50-53dB L_{Aeq} , still within the 8233/ProPG preferred range.

Noise from Local Centre

- 6.12. Noise sources with the potential to affect residents closest to commercial operations would include delivery vehicles and external mechanical plant. It is unlikely that customer/staff vehicle sound would be noticeable above ambient traffic noise as the units would presumably only operate during normal trading hours, which although not finalised, will typically be within periods of low noise-sensitivity.

Delivery Vehicle Noise

- 6.13. Noise from delivery vehicles and unloading activity is typically controlled by restriction of hours. During the day, ambient noise is generally sufficient to effectively mask delivery noise, and as mentioned above, sensitivity is low anyway. It is early morning and late evenings when noise-sensitivity rises and ambient noise levels are lower, that need to be avoided for deliveries.
- 6.14. In terms of reverse alarms, the location of the delivery bay is such that some reversing manoeuvres would seem to be necessary, but with the restriction on hours recommended below, the occasional use of the alarms is unlikely to cause significant disturbance. And in further potential mitigation, the installation of 'white-noise' type alarms is becoming increasingly common, which are less disturbing than the older 'beeping' type.

- 6.15. In terms of delivery hours, based on the likelihood that ambient noise levels will fall away relatively quickly in the evenings, it would be recommended that no deliveries take place outside the hours of 07:00 – 22:00 Monday-Saturday and 09:00 – 13:00 on Sundays and bank holidays. This should ensure that the quieter, more noise-sensitive periods are avoided, and consequently no disturbance should be likely.
- 6.16. In additional mitigation of delivery and unloading noise, the location of the loading bay is as far from residential façades as is reasonably practical within the constraints of the site layout. The bay faces the entrance to the Local Centre off 'Road B', and any noise impact from unloading and service vehicle movements on the proposed dwellings will be shielded to a certain extent by structures for cycle and bin storage.
- 6.17. There will be flats above the delivery bay but the façade over the bay will have no windows. Noise-sensitive rooms will consequently be shielded by the corners of the building.

External Plant Noise

- 6.18. At the time of writing, only external plant for the proposed local supermarket is being considered for the current planning application. We understand that any plant that may be installed to service the two smaller commercial units will be subject to separate planning applications.
- 6.19. For the supermarket it is shown on the latest layout drawings that a dedicated plant space has been allocated on the eastern end of the building, adjacent to the loading bay and facing the access road to the Local Centre. It will be located between the loading bay and bin storage areas, and is understood to contain all external elements of the refrigeration and air-conditioning systems likely in the shop. At this stage, no specific detail of the plant to be installed is available, but based on the size of store the plant is likely to consist of 4-6no. small condenser units to service both chiller and air-con systems.
- 6.20. Table 6 below shows typical manufacturer/measured noise data for units likely to be similar to those to be installed at the site. The cumulative data are based on daytime usage when the store will be open. Overnight, only one 'top-up' chiller condenser is likely to be operational.

Table 6. Typical plant noise data (dB L_{eq})

Specific plant noise	Over-all level per unit (@1m)	Octave band centre frequency (Hz)						
	L _{Aeq}	63	125	250	500	1k	2k	4k
Chiller Condensers Danfoss (x2*)	60	62	63	61	55	48	42	38
A/C condenser units Mitsubishi (x2*)	58	67	65	56	53	53	50	45
Cumulative level (all plant running)	65	71	70	65	60	58	53	49

* Typical maxima running simultaneously during opening hours

- 6.21. The cumulative values in the table above are based on the total noise level of all plant, based on 2no. of each unit running simultaneously while the store is open, which would typically be the maximum under normal conditions. As noted above, overnight, or when the store is closed, it is likely that one chiller condenser only will be running at any given time.
- 6.22. The normal criteria to assess the impact of noise from mechanical plant would be BS 4142:2014+A1:2019. That standard relies on comparison with the existing background noise environment at the receptor locations, and in this case, it will not be possible to obtain representative background noise levels until the completion of the phase and the cessation of all construction activity on this phase and any adjacent phases, as well as full use of the relief road and internal roads.
- 6.23. However, in order to gain an indication of the noise impact on local receptors it is possible to calculate the cumulative noise plant noise levels on the closest proposed dwellings, with corrections for distance, shielding and orientation, and compare with an estimated background level obtained from previous surveys of a similar development environment.
- 6.24. The closest receptor dwellings have been identified as Plots 56, 57, 58, 59, 66, 69, 72, 77, 78, 83, as indicated on Figure 3 in the appendix. The relative location of the plant area is also shown in Figure 3. As noted above, the possible noise level can be calculated to these receptors, taking into account the attenuation factors of distance to the plant, shielding from any structures in between and orientation of the receiving façades to the plant space.
- 6.25. Table 7 below shows a BS 4142-type assessment of the plant on all these dwellings, which for convenience have been condensed into four groups – Group1 (Plots 56,57), Group 2 (58,59), Group 3 (66,69,72,78) and Group 4 (77,83). The factors noted above have been incorporated into the calculations and baseline noise data have been extrapolated from past surveys.

Table 7. Estimated plant noise impact on receptors based on BS 4142:2014+A1:2019 subjective methodology – dB(A)

Details		Receptor Group 1	Receptor Group 2	Receptor Group 3	Receptor Group 4
Specific noise from plant at 1m distance - cumulative day / night ⁽¹⁾ (Table 6) - dB L _{Aeq}		65 / 60	65 / 60	65 / 60	65 / 60
Distance correction (25m,25m,25m,5m)		-28	-28	-28	-14
Correction for shielding or orientation		-5	-3	-5	-12
Acoustic feature correction: tonal		+2 ⁽²⁾	+2 ⁽²⁾	+2 ⁽²⁾	+2 ⁽²⁾
Acoustic feature correction: impulsivity		0 ⁽³⁾	0 ⁽³⁾	0 ⁽³⁾	0 ⁽³⁾
Cumulative level at external receptor façades - day / night (BS 4142 Rating Level)		34 / 29	36 / 31	34 / 29	41 / 36
Typical low background noise level (L _{A90})	Daytime	52	52	52	52
	overnight	40	40	40	40
Difference	Daytime	-18	-16	-18	-11
	overnight	-11	-9	-11	-4
Uncertainty	Uncertainty is considered to be low in this instance for the following reasons:- <ul style="list-style-type: none"> • The noise source will be steady and continuous • The background data is likely to show good correlation over the period • The data should represent all receptors • For the survey utilised, the weather was prevailing and did not affect results • Instrumentation shift was within 0.1dB 				

(1) Night-time refrigeration only – for fridges top up

(2) Tonal character judged to be just perceptible

(3) No discernible impulsivity as noise steady

6.26. According to the criteria of BS 4142, “Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact..”. A rating level of around +5dB is likely to indicate an adverse level.

6.27. In this instance it can be seen that the estimated impact is low, based on the sample data utilised.

7. CONCLUSIONS

- 7.1. Data from previous TA traffic flow for the new Relief Road and 'Road B' have been used, with suitable future growth predictions, to assess the noise impact on the proposed Phase 3A development, taking into account the dominant noise source of passing road traffic on the roads, 120m+ and 10m+ respectively from the closest plots. Traffic on the A143 will be insignificant as a discrete noise source post-development.
- 7.2. Calculations have shown that a suitable scheme of glazing and ventilation, as detailed in Table 4 of this report, will ensure that internal noise levels in the new dwellings will be within the criteria of BS 8233:2014 guidelines, as required by the local authority Public Health & Housing team.
- 7.3. In terms of outside amenity space noise, based on the latest layout, all private gardens will benefit from inherent shielding by their own, or further into the site, other, building shells and are predicted to meet the BS 8233/ProPG preferred range of 50-55dB $L_{Aeq,16hour}$. Noise levels within the POS to the north of the site, available as an additional amenity space, are also predicted to be within the BS 8233/ProPG preferred levels.
- 7.4. Noise from service vehicles and unloading in the supermarket delivery bay should be adequately mitigated by restricting delivery hours as recommended within. It is acknowledged that reverse alarms will inevitably be audible from vehicles manoeuvring into the bay, but this should occur relatively infrequently, and also only within hours that are generally regarded as low sensitivity to noise. In further potential mitigation, increasingly delivery vehicles are being fitted with 'white-noise' type reverse alarms, which significantly reduce any noise impact.
- 7.5. Noise from external plant is predicted to meet the criteria of BS 4142:2014+A1:2019, based on the estimated data for baseline noise and plant noise, that can only be utilised at this stage. However, during certain quiet conditions overnight, noise from operating chiller condenser may approach background noise levels. Whilst this unlikely to lead to disturbance given the additional attenuation from even open windows, careful selection of quiet unit types should be considered.
- 7.6. It would also be good practice to enclose the plant space with solid panelling as much as is practical without compromising the necessary air-flow to the units. The plant installation engineers should be able to advise on the practical options available to reduce noise breakout from the plant area.

- 7.7. In conclusion it is considered that if the recommendations within this report are incorporated into the design of the Phase 3A dwelling façades and the mitigation recommendations for the delivery hours and plant area are implemented, the impact of environmental noise on future residents will be deemed to meet the requirements of the local authority criteria and should ensure that the noise environment, both internally and externally, will not adversely affect the amenity of future residents. This document is therefore considered suitable to support a Reserved Matters application for Phase 3A.

APPENDIX 1

Explanation of Noise Terms

- A2.1 The L_{Aeq} indicates the average noise level and is the 'equivalent continuous' noise level over a sample period. It is the single parameter now commonly used to describe a noise environment. Most of the guidance on noise uses ' L_{Aeq} ' to define acceptable levels.
- A2.2 The L_{A10} indicates traffic noise levels and is the noise level exceeded for 10% of the sample period. It gives a good indication of the spread of noise events in a given environment. Near a busy road, the L_{10} and the L_{eq} are closely correlated, with the L_{10} typically 2-5dB higher than the L_{eq} .

APPENDIX 2

Figure 1. Overall development plan with Phase 3A extent outlined in blue

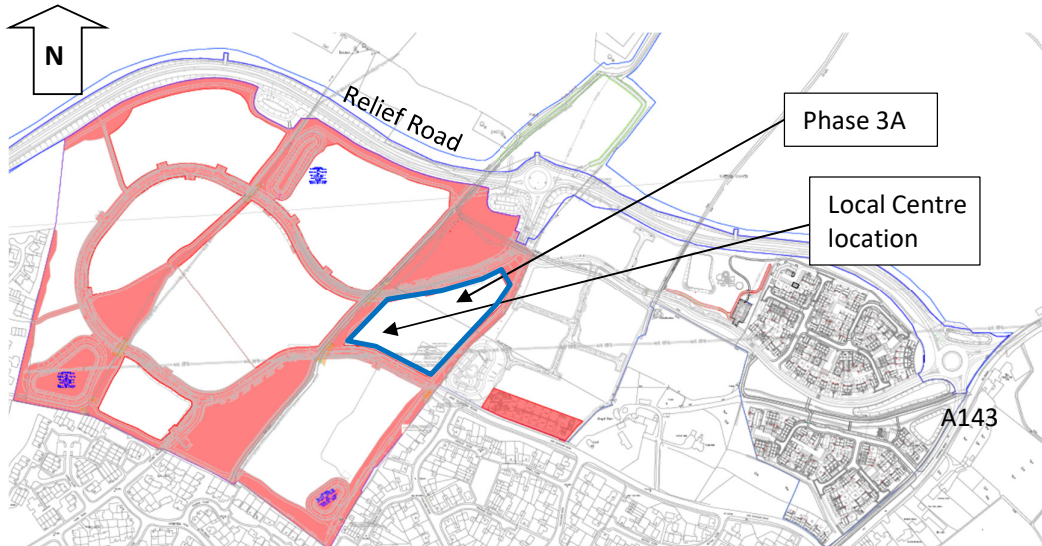


Figure 2. Detailed layout of the Phase 3A application site

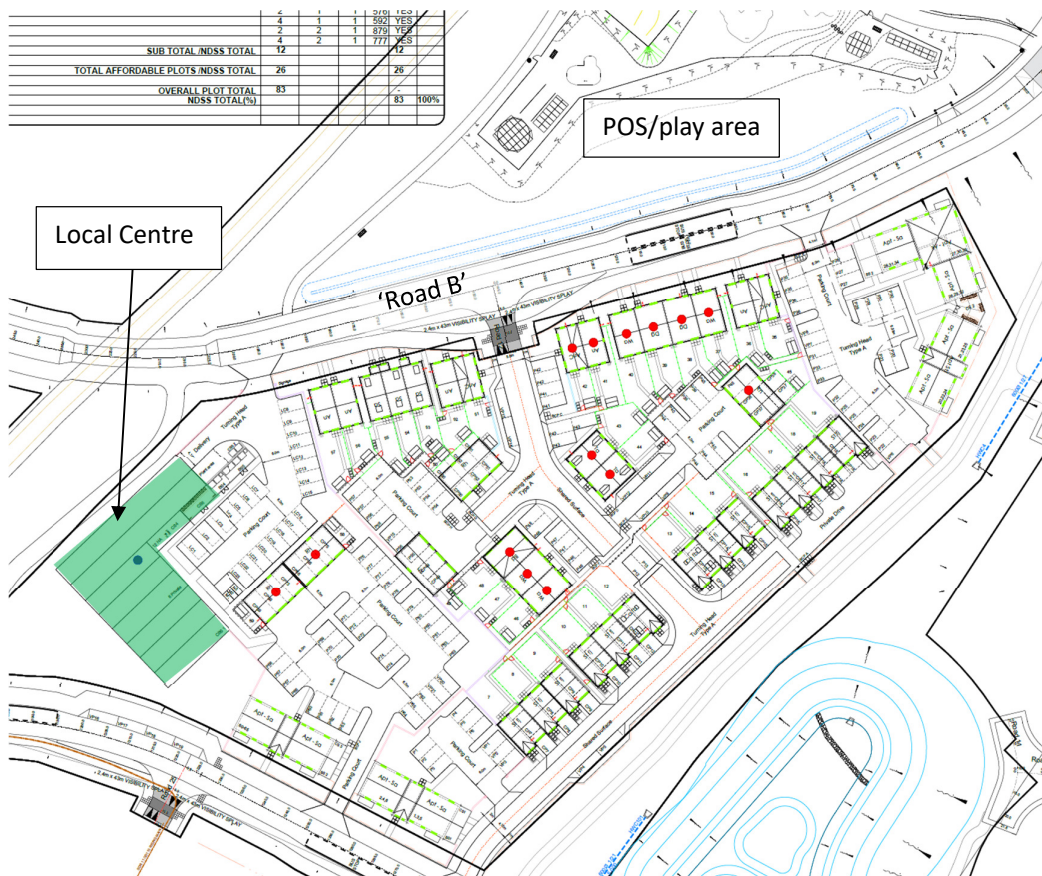


Figure 3. Proposed Local Centre external area layout. External G/F plant area shaded red, and receptor groups closest to plant area other colour-shaded.



Receptor Group Key

- Group 1.....
- Group 2.....
- Group 3.....
- Group 4.....